

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 : B05B 11/00, 11/02	A1	(11) International Publication Number: WO 92/20455
		(43) International Publication Date: 26 November 1992 (26.11.92)

(21) International Application Number: PCT/IT92/00050

(22) International Filing Date: 15 May 1992 (15.05.92)

(30) Priority data:

GE91A000070
GE91A000098

17 May 1991 (17.05.91)
25 July 1991 (25.07.91)

IT
IT

(71) Applicant (for all designated States except US): ROSARIA GALLI & C. S.A.S. [IT/IT]; Via Ruffini, 1/8, I-16032 Camogli (IT).

(72) Inventor; and

(75) Inventor/Applicant (for US only) : GALLI, Rosaria [IT/IT]; Piazza San Giovanni Bono, 39/12, I-16036 Recco (IT).

(74) Agent: ANSELMO GAUTIERO, Maria, Luisa; Studio Rinaldini & Co., Via Dante, 2/33, I-16121 Genova (IT).

(81) Designated States: AT (European patent), BE (European patent), CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), GR (European patent), IT (European patent), LU (European patent), MC (European patent), NL (European patent), SE (European patent), US.

Published

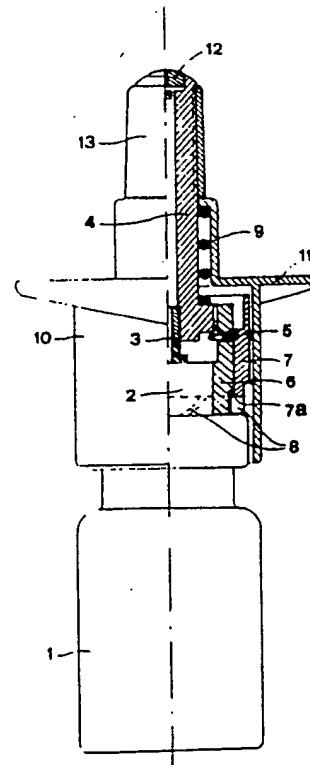
With international search report.

Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: MECHANICAL SELF-ACTUATED SYSTEM FOR MEDICAMENT ATOMIZING DISPENSERS

(57) Abstract

Mechanical self-actuated system for particular pharmaceutical packs the contents of which shall be administered as an atomized spray of exact small doses, said packs being either of the multi-use or the single-use type and having incorporated therein a dosing pump to be actuated manually with a given force to ensure a perfect atomization; however, patients cannot exert or measure said force exactly and thus they cause insufficient and not atomized dispensations; the system according to this invention aims to avoid this disadvantage by using a spring-loaded self-actuated head with a first manual actuation step for loading the spring (9) and a successive snap-release step by the action of a mechanical self-release (5, 6, 7) at the end of the stroke for actuating the delivery pump, said pump being therefore actuated with the exact force for an optimum atomization, said force depending only upon the exact choice of the spring (9).



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FI	Finland	MI	Mali
AU	Australia	FR	France	MN	Mongolia
BB	Barbados	GA	Gabon	MR	Mauritania
BE	Belgium	GB	United Kingdom	MW	Malawi
BF	Burkina Faso	GN	Guinea	NL	Netherlands
BG	Bulgaria	GR	Greece	NO	Norway
BJ	Benin	HU	Hungary	PL	Poland
BR	Brazil	IE	Ireland	RO	Romania
CA	Canada	IT	Italy	RU	Russian Federation
CF	Central African Republic	JP	Japan	SD	Sudan
CG	Congo	KP	Democratic People's Republic of Korea	SE	Sweden
CH	Switzerland	KR	Republic of Korea	SN	Senegal
CI	Côte d'Ivoire	LI	Liechtenstein	SU	Soviet Union
CM	Cameroon	LK	Sri Lanka	TD	Chad
CS	Czechoslovakia	LU	Luxembourg	TG	Togo
DE	Germany	MC	Monaco	US	United States of America
DK	Denmark	MG	Madagascar		
ES	Spain				

Mechanical self-actuated system for medicament atomizing dispensers.

DISCLOSURE

5 In the pharmaceutical field, in order to solve some particular curative problems, specific packs have been developed either for single-use or multi-use utilization, comprising a container having a pump incorporated therein and manually-actuated dispenser for administration by means
10 of an atomized and dosed spray. Practically, said packs have given satisfactory results, but lately - due to the type of medicaments to be administered, which are concerned with serious pathologies - the qualitative requirements of dispensation have become more strict and the known
15 dispensers have shown to be not sufficiently dependable. Therefore, the specialized manufacturers have been required to solve new problems, and the article of the invention aims to provide a reliable and practical solution.
The container/dispenser packs being marketed presently are
20 based on manually-actuated mechanical systems wherein the user's depression of the slider which transfers the thrust to the pump mainly affects the quality of the dispensation. If, for example, the slider is depressed slowly, the dispensation is unsuitable, i.e. dropwise, with a not
25 atomized jet or the like, which compromises the uniform distribution over the nose mucosa and is detrimental to the absorption of the medicament. Therefore, the problem to be solved is how to render the quality of dispensation independent of the amount and the speed of depression
30 exerted by the user onto the slider of the control head; the article of the invention aims to solve this problem.
Substantially, the control head of the present invention constitutes the control and atomization manual system for the assembly of the medicament administering pack; the container and the pump arranged therein, with the sealed
35 portion provided with a protruding cylindrical attachment neck, are unchanged. The proposed control assembly will be normally introduced into said neck in lieu of any other

known assembly; however, thanks to a self-actuated and self-loaded snap system, it has the peculiarity of ensuring a perfect atomized and dosed dispensation as desired, regardless of the pressure or actuation speed on the slider. Briefly, therefore, the basic principle of the invention is based on the use of a spring-loaded self-actuated mechanical system which during the actuation stroke comprises a first spring-loading step and a successive automatic snap-release of the stored energy, which actuates the dispensing and dosing pump automatically, constantly and independently. The mechanism developed for this automatic snap-release at the end of the stroke comprises a resilient elastic element which tends, or is forced, to change its shape and position to permit the unlocking and release of the tension stored in the spring while being loaded. This resilient element can be provided with different shapes, as under described, while maintaining its detent function unchanged.

The accompanying drawings show in different scales, by way of non-limiting examples, a basic embodiment of the article of the invention, with some possible modifications tending to facilitate the realization of the system on an industrial scale and its application on the different packs being marketed. In the drawings:

Fig. 1 is a fragmentary axial sectional view of the multidose container/dispenser assembly being concerned, with a manually-controlled and automatically snap-actuated head according to the invention;

Fig. 2 is a fragmentary enlarged axial sectional view of the head of Fig. 1 prior to the actuating stroke and loading of the compression coil spring;

Fig. 3 is a view similar to Fig. 2, with the system in the position when the snap actuation for dispensation has occurred;

Fig. 4 is a fragmentary side elevational and partly axial sectional view similar to Fig. 1, of a modified embodiment with a resilient self-release expansion-effective member, in its rest condition;

Fig. 5 is a view similar to Fig. 4 at the end of the dispensing step effected by the snap-release of the spring as a result of the compression, through the supporting bush, of the resilient member so as to eliminate its
5 opposing action;

Fig. 6 is a view similar to Fig. 4 of a slightly modified embodiment, i.e. comprising an outer sleeve in the form of an internal annular ridge integral with the body constituting the slider of the atomizing assembly and
10 adapted to compress the resilient member;

Fig. 7 is a view similar to Fig. 6, with the parts in the condition at the end of the dispensing step, i.e. after the self-release of the previously-loaded spring;

Fig. 8 is a fragmentary side elevational and partly
15 axial sectional view of an atomizing head according to the present invention, as a modification for application on single-use atomizers, the components being in the rest condition, i.e. before the spring is loaded;

Fig. 9 is a view similar to Fig. 8, the components
20 being in the position occurring at the end of the dispensing step, i.e. after the self-release of the previously-loaded spring;

Fig. 10 is a fragmentary side elevational view of a guide bush wherein, as a detail modification, the resilient
25 member is molded integral with said bush;

Fig. 11 is a sectional plan view on the line B-B of the Fig. 10;

Fig. 12 is a view similar to Fig. 8 of a single-use atomizing head with a modified release system based on the
30 use of an opposing resilient member in the form of shaped slotted bush instead of a ring;

Fig. 13 is a fragmentary side sectional view of the resilient shaped bush of Fig. 12;

Fig. 14 is a plan view of Fig. 13;

Fig. 15 is a view referred to the Fig. 8 to 14, showing a further modification of the components for the self-release of the spring which causes the atomized dispensation.

As shown clearly in Fig. 1, the container/dispenser for multi-dose endo-nasal administration substantially comprises a container 1 having inserted therein a conventional sealed pump with a protruding cylindrical neck 2 and a feeding tube 3 for the solution to be dispensed; on said cylindrical neck there can be locked any known system of control and atomization head. In the present instance and as shown, there is locked a head which is constructed as proposed by the invention, said head comprising a cylindrical tubular body 4 having the atomizing nozzle 12 on the top thereof, a supporting bush 6, an outer sleeve 7 provided with depending resilient projections 8, a compression spring 9 and, finally, a slider 10 with depression and grip radial planar extensions 11.

The operation of the head will be described hereinafter with particular reference to Figs. 2 and 3. In the rest position shown in Fig. 2, the compression spring 9, which rests on a lower shoulder of the tubular body 4, is released though having, anyway, the capability of keeping the slider 10 in the raised position. In this position the bush 6 has a resilient abutment element 5, operating in a slotted groove in "Seeger" ring fashion, in a protruding position wherein it opposes the descent of the cylindrical tubular body 4. The resilient ring 5, in this position, is obliged to protrude inwardly of the sleeve 7. Therefore, by depressing the slider 10 downwards for use, at the beginning of the stroke thereof, thanks to the pre-established clearance indicated at "A", the spring 9 is depressed and is loaded, while the other parts keep still due to the locking action of the ring 5. However, as soon as the clearance "A" is eliminated, the inside planar portion of the slider 10, which is of cup-shape, abuts against the circular top end of the sleeve 7 and moves it downwards. At a suitable position, said sleeve 7 is formed with a circular enlargement which, as seen in Fig. 3, upon reaching the level of the resilient ring 5, permits the latter to expand. As a result, the inward protruding portion of the ring is retracted and the cylindrical

tubular body 4, due to the action of the loaded spring 9, moves downwards with a strong snap action and causes the dispensation through the atomizing nozzle 12, said dispensation being always constant and independent of how 5 the user has depressed the slider 10 of the head. Finally, it is to be noted that, in order to limit the spring's expansion and the slider's stroke upwards, according to the invention, a threaded sleeve 13 or any other means having the same effect is fitted on the end of the cylindrical 10 tubular body 4. As a further provision for positioning the sleeve 7, the latter is provided at the bottom with an inwardly protruding rim 7a which, in detent fashion, engages a corresponding shoulder on the supporting bush 6. Once the depression action is terminated, and the slider 10 15 released, the system returns to its rest condition by means of the thrust provided by the valve spring (not represented) against the cylindrical tubular body 4 through the feeding tube 3, the return of the spring 9, which moves upward the slider 10, and the thrust provided by the 20 resilient projections 8 to the sleeve 7.

The present system, yet preserving the basic characteristics, is liable to various modifications, as shown in the Figs. 4 to 15.

Figs. 4 and 5 show a modification wherein the resilient 25 element 105 is normally in an expanded position and is accommodated in a circular groove made on the lower collar of the cylindrical tubular body 104. The outer sleeve 107 is provided with an upper inner edge.

As a result, when the slider 110 is depressed for use, at 30 the beginning of its stroke, due to the pre-established clearance "A", the spring 109 is compressed and loaded, but the other parts will keep still because the resilient ring 105, acts as a detent. However, as soon as the clearance "A" is eliminated, the sleeve 107 is lowered and 35 the bevel at its inner edge urges the resilient ring 105 radially so as to eliminate its axial detent function. Then, the cylindrical tubular body 104, urged by the loaded spring 109, will be snapped down strongly to the position

of Fig. 5 and will cause the dispensation through the atomizing nozzle with an identical result as the one previously described.

5 Figs. 6 and 7 show a further detail modification wherein an annular ridge 207 molded integrally in the interior of the slider 210 substitutes for the outer sleeve 107. Said ridge 207 has the same outline as the upper inner edge of the sleeve 107 and ensure the same function thereof, with the advantage of eliminating a separate component.

10 According to the invention, the system can be applied, still in the field of atomizing dispensers for medicaments to be administered in endo-nasal manner, with the same advantages, to the known single-dose or single-use packs. Some modifications developed for this instance are shown in
15 the Figs. 8 to 15, and these modifications, still based on the same operating principle, will be described below.

Figs. 8 and 9 show a first modification. The main body 312 of the dispenser and the cylindrical housing 310 associated therewith constitute the basic portions and enclose the tubular member 303 having at the top the atomizing nozzle and at the bottom the pumping plunger operating in the container 301 containing the dose of solution to be dispensed and which is axially slidably inserted in the tubular member 303. Externally thereof is also axially mounted the bush 306 having the task of guiding the housing 310 with respect to the container 301 with a stroke which is limited by suitable stops. Arranged between the bottom of the cup-shaped housing 310 and the closed end of the container 301 is a coil spring 309 having the function to effect, after the manual loading and as a result of the self-release, the snap-release for the atomized dispensation of the packed substance. The self-release occurs according to the basic principle of the invention, i.e. by the action of a resilient annular member 305 accommodated in a suitable seat in the bush 306 and tending to protrude towards the inner wall 307 of the housing 310 which, however, in the rest condition and successively in the loaded condition (Fig. 8), opposes its expansion.
30
35

In these conditions, the resilient member 305, in this instance of flattened round section, protrudes inwardly and prevents the centering cup 304 for the spring 309 mounted on the container 301, from advancing and effecting the dispensing stroke. In the use, the single-use pack is grasped as usual, with the thumb against the bottom of the housing 310. When depressed, the latter is moved as shown by the arrow and the spring 309 is loaded until (Fig. 9) the member 305 may expand into the larger diameter chamber of the housing inner wall 307 and, therefore, ceases protruding inwardly, thus releasing immediately the components 305 and 304 which, urged by the loaded spring 309, will be advanced suddenly and will cause an energetic dispensation and a perfect atomization.

A number of changes may be made to the above, some of which are shown by way of illustration in the Figs. 10 to 15.

Figs. 10 and 11 show a modification wherein the annular resilient member is molded integrally with the guiding sleeve. In this instance, the bush 406, similar to the original bush indicated at 6 in the Figs. 1,2,3 and at 306 in the Figs. 8 and 9, at a suitable level has two slits to form integrally, in the thickness of the wall, two resilient ring segments 405 which are provided at the respective free ends, with a suitable protrusion 400 each having the function of bearing against the sleeve 7 or the housing wall 307, or against the cylindrical tubular element 4 or the cup 304 so as to act like the resilient member or ring 5 or 305 and substitute for it.

In a successive modification, as clearly shown in Fig. 12, the bush 306 and the resilient element 305 are replaced with a slotted resilient tubular member 506 shown in the detail Figs. 13 and 14, which thanks to a shaped edge 505, in the rest condition, bears against the inner side of the slider 512. The member 506 has fitted axially slidably thereon the mouth of the housing 510 and the spring 509 bears against said housing. The operation of the self-release is simple: upon depression for use against the bottom of the housing 510 to cause it to advance along the

cylindrical portion of the member 506, the spring 509 is loaded. On completion of this stroke, the edge 507 of the mouth of the housing 510 engages the outer shaped slitted collar 505 of the resilient member and depresses it up to a 5 level to make it lose its abutted condition, whereupon the assembly is snapped forward and causes the finely atomized dispensation as required.

The slitted resilient tubular member 506 may be constructed of different shapes and with a larger number of sectors and 10 slits still within the operative principle thereof.

In a further modification shown in Fig. 15, the resilient member 506 is replaced with a cylindrical sleeve 606 on the upper end of which rests a slitted annular resilient member 605 having a shaped and externally conical edge which 15 operates similarly to the preceding modification. Also the operation is the same as that which has been described above.

As to detent and opposing member devised by the system of the invention as the basic member for effecting the snap 20 dispensing step of the solution to be atomized, it is finally to be noted that said member may be provided in many other shapes and, if desired, it may be replaced with mobile members of various kinds, such as balls or the like. As to the remainder, all as described and shown, made of 25 any suitable material, liable to modifications and improvements, still within the basic principle of the invention.

CLAIMS

1- Mechanical self-actuated system for atomizing dispensers of medicaments packaged in containers having a pump incorporated therein, which containers may be indifferently of the conventional either multi-use or single-use types, said system being mounted as usual on the protruding cylindrical neck of said pump and being characterized in that it incorporates a mechanical self-actuated spring-loaded system which, during the actuation stroke, comprises a first spring-loading step and a successive snap-release of the stored energy which actuates the dispensing and dosing pump automatically, constantly and independently. Said system, in the case of the multi-dose applications comprising an actuating head characterized in that it is formed by a central cylindrical tubular body (4) having the atomizing nozzle (12) at the top and pre-arranged for fitting on the delivery tube (3) of the pump, a supporting cylindrical bush (6), an outer sleeve (7) with a two-diameters inner bore, a compression coil spring (9) mounted around said central cylindrical body (4), and a guided inverted cup slider (10) with depression and grip radial extensions (11).

25 2- A system according to claim 1, characterized in that the central tubular body (4) which is fitted on the protruding portion of the pump delivery tube (3) comprises at the bottom a shoulder whereon the compression coil spring (9) rests and around which said cylindrical supporting bush (6) is movably mounted, said bush having a circular slotted groove serving as a seat for a resilient element (5) of the "Seeger" ring type, said ring (5) protruding inwardly and opposing the movement of the shoulder on the central body (4) during most of the actuating stroke of the slider (10).

35 3- A system according to claims 1 and 2, characterized in that the sleeve (7) having the two-diameters inner bore and slidably mounted around the supporting cylindrical

bush (6) is so sized as to keep said resilient element "Seeger" ring type (5), within the groove in said bush (6) in a compressed condition, and to release it only at the end of the actuating stroke of the slider (10).

5 4- A system according to the claims 1 to 3, characterized in that the slider (10) mounted around said components, including the compression coil spring (9), during its actuation stroke, loads said spring (9) and simultaneously moves downwards the sleeve (7) surrounding 10 the supporting bush (6) and keeping said "Seeger" type resilient ring (5) in a compressed condition.

15 5- A system according to claims 1 to 4, characterized in that said outer sleeve (7) is provided at the bottom with resilient projections (8) or other suitable means tending to urge it upwards in the rest position.

20 6- A system according to the claims 1 to 5, characterized in that a sleeve (13) or any other member limiting the expansion stroke of the compression spring, and therefore of the slider, is mounted threadedly or 25 similarly on the protruding upper portion of the central tubular body provided with the atomizing nozzle.

25 7- A system according to the claims 1 to 6, characterized in that a detail modification the head comprises a cylindrical tubular body (104) having at the bottom a collar with circular groove for accomodating the resilient ring member (105), a supporting bush (106) which can be locked on the neck of the container, an outer sleeve (107) slidable on said bush (106) replacing respectively the cylyndrical tubular body (4), the resilient member (5), 30 the supporting bush (6) and the outer sleeve (7).

35 8- A system according to claims 1 to 7,characterized in that the cylindrical tubular body (104) is surrounded by a coil spring (109) which bears at the bottom on its collar and at the top against a shoulder on the slider, with the peculiarity that in the rest condition the cylindrical tubular body (104), through the resilient ring (105) housed in said accomodating groove and protruding therefrom, rests on the top plane of said bush (106) and, therefore, is

prevented from moving down even if urged by the spring (109).

5 9- A system according to claims 1 to 8, characterized in that the outer sleeve (107) mounted around the supporting bush (106) on said head and provided at the top with a rim which protrudes inwards and is beveled, permits the resilient ring (105) to protrude in the rest position, but it makes it retract into its seat at the end of the actuation stroke or spring-loading stroke.

10 10- A system according to claims 1 to 9, characterized in that the outer sleeve (107) of the head, when its outer edge contacts the upper end of the supporting sleeve (106), is able to make the resilient ring (105) retract completely at the end of the actuation and loading stroke of the spring (109), thus eliminating the opposing force thereof and causing the self-release and snap-action of the spring (109).

20 11- A system according to claims 1 to 10, characterized in that in a detail modification in the head and more specifically in the inner side of the slider (110), the outer sleeve (107) which presses the resilient member (105) is replaced with a shaped annular ridge (207) integrally molded with the body of said modified slider (210).

25 12- A system according to claims 1 to 11, characterized in that it is realized on dispensing/atomizing heads of the single-use type wherein the container of the solution to be administered is constituted by a cylindrical cup-shaped body (301) slidably mounted in the actuating slider (312) and containing the plunger of the pump, enclosed by a 30 cylindrical housing (310) containing a coil spring (309) with a centering cup (304), a bush (306) with a seat for an annular resilient member (305) acting as a detent in the rest condition until released by the larger diameter of the inner wall (307) of the housing (310), and capable of 35 causing the self-release at the end of the spring-loading stroke, which at said moment snaps to cause a finely atomized dispensation.

13- A system according to claims 1 to 12, characterized

in that in a detail modification in the head and more specifically in the bush (6) or (306) with the seat for the annular resilient member (5) or (305), said bush (406) constructed with two ring segments (405) integrally molded
5 in the thickness of the wall thereof, said segments being urged to the closed position by the engagement of their free ends (400), provided with a cam-like protrusion, against the sleeve (7) or the inner wall (307) of the cylindrical housing (310), or against the cylindrical
10 tubular element (4) or the centering cup (304).

14- A system according to claim 12, characterized in that, in a detail modification, its head is provided interiorly, as a member for self-release of the loaded spring, with a shaped, resilient, slitted tubular member (506) having a conical end rim (505) adapted to be engaged by the edge (507) of the inner wall of the housing (510) of the assembly and compressed at the end of the spring-loading stroke so as to cease its detent function and cause the spring (509) to be snap-released.

15- A system according to claims 12 to 14, characterized in that in a detail modification, said head is provided interiorly, as a member for self-release of the loaded spring, with a rigid bush (606) having an added resilient ring (605) operating similarly to the
20 tubular resilient member (506) of the preceding claim.

16- A system according to claims 1 to 15, characterized in that said dispensing and atomizing head has incorporated therein mechanical, self-actuation spring means pre-set for a first snap-release step, said release being effected with
25 the aid of one or more resilient or mobile members used in opposition to other members, and said resilient or mobile members may be annular, tubular, ring-sector-shaped members or the like, always shaped suitably, all without excluding spheres or the like.

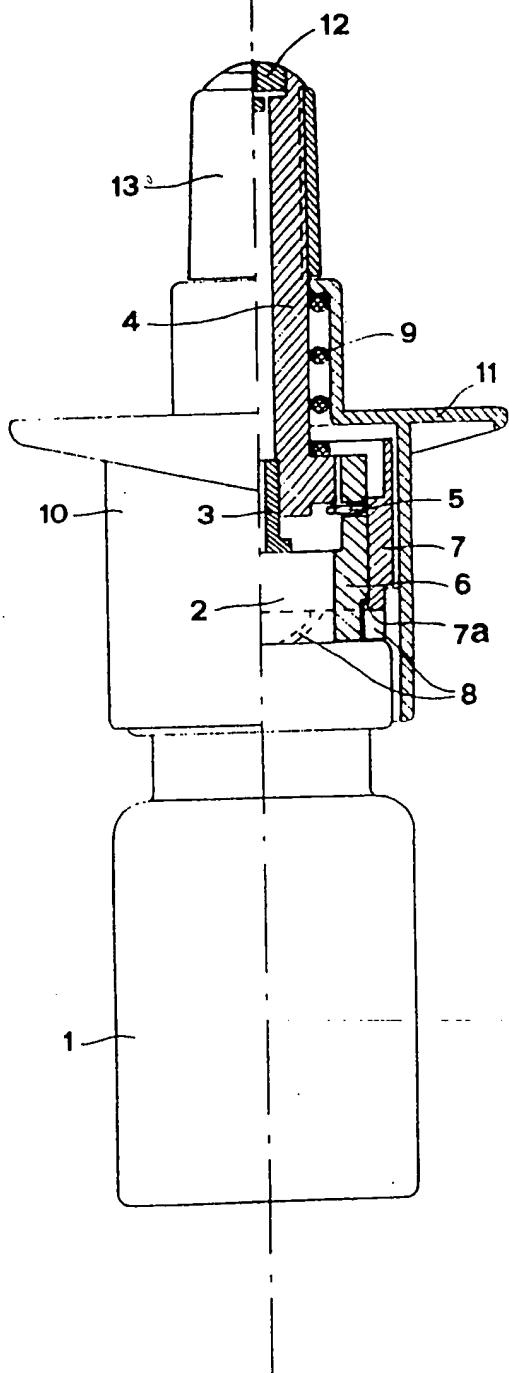
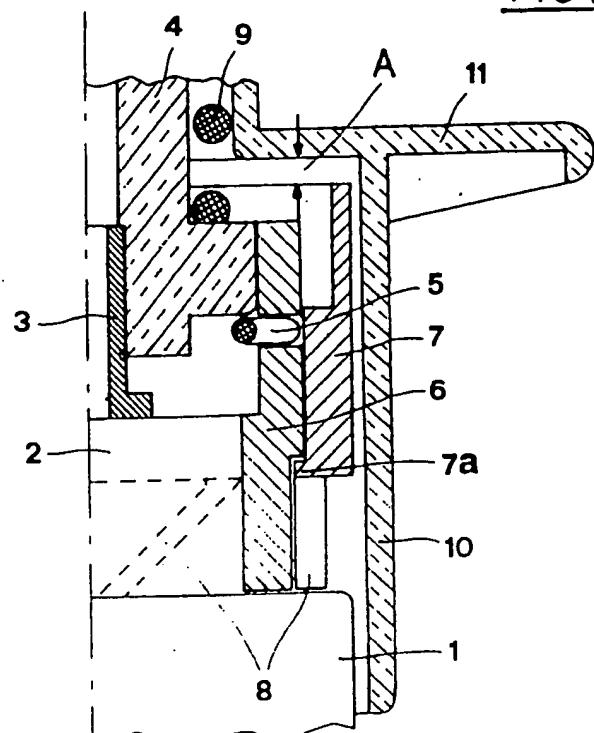
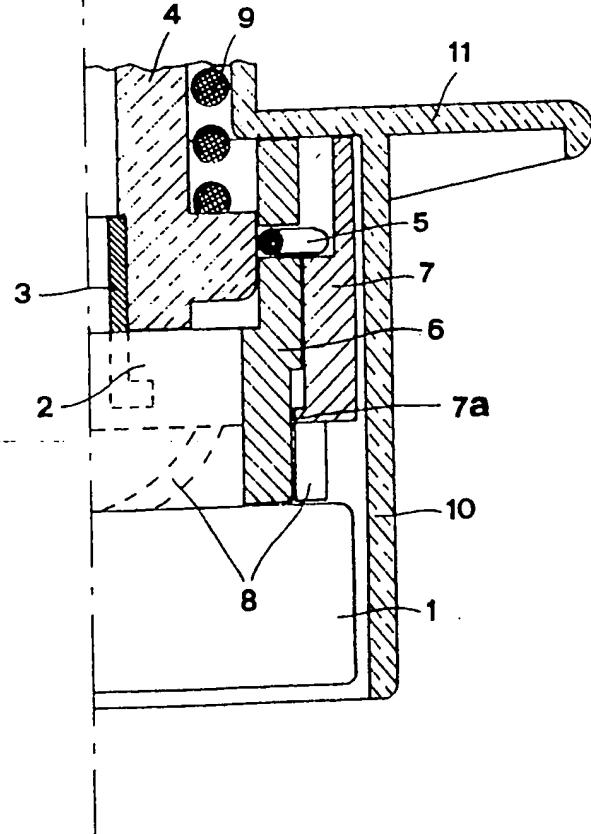
FIG.1FIG.2FIG.3

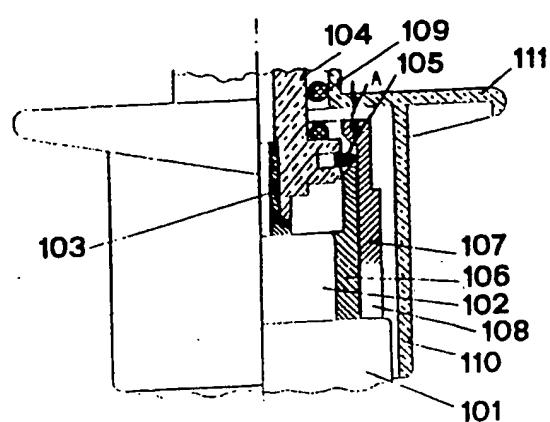
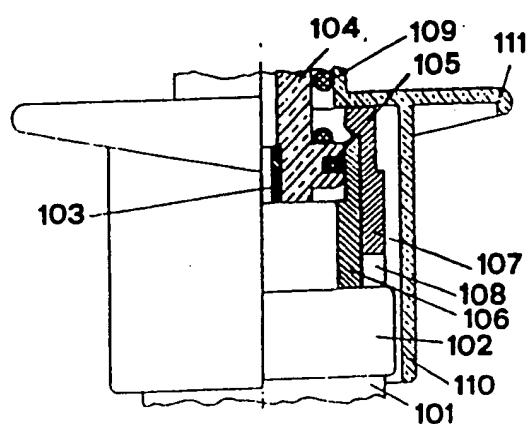
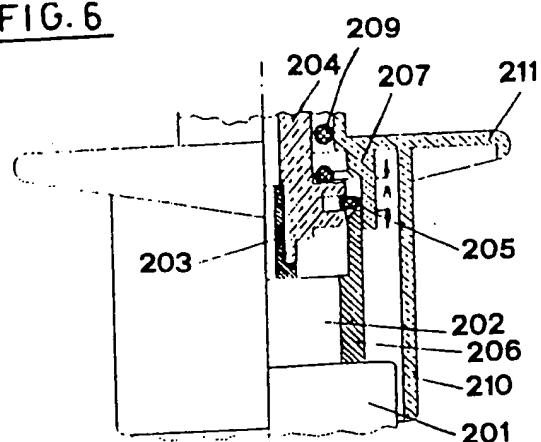
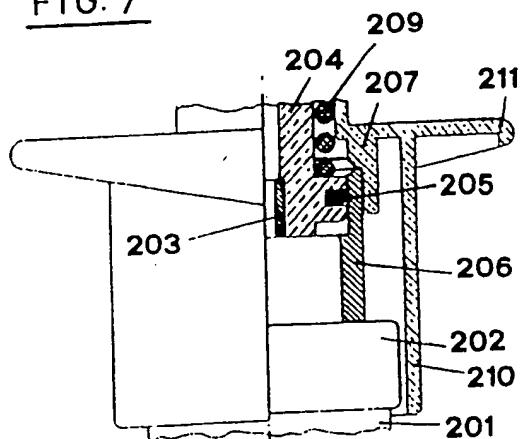
FIG.4FIG.5FIG.6FIG. 7

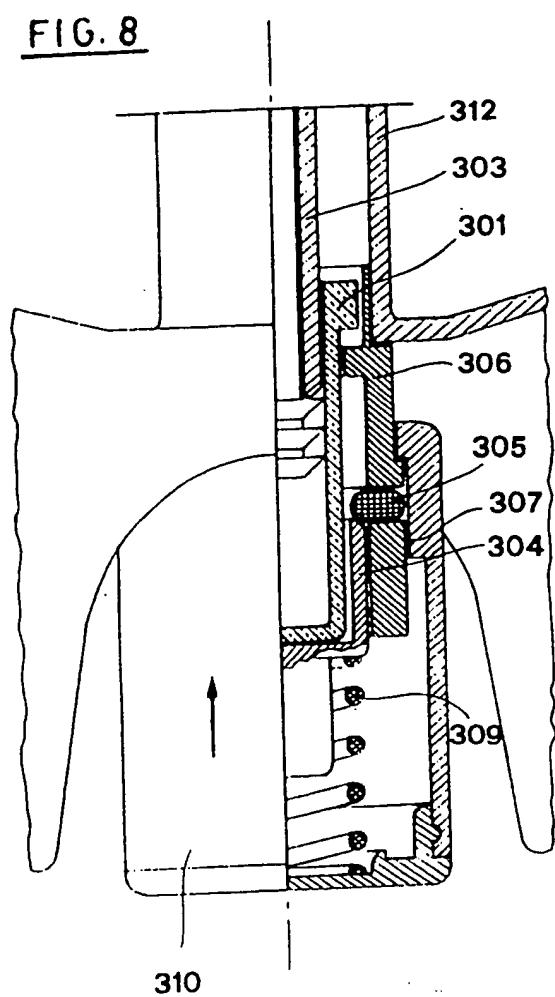
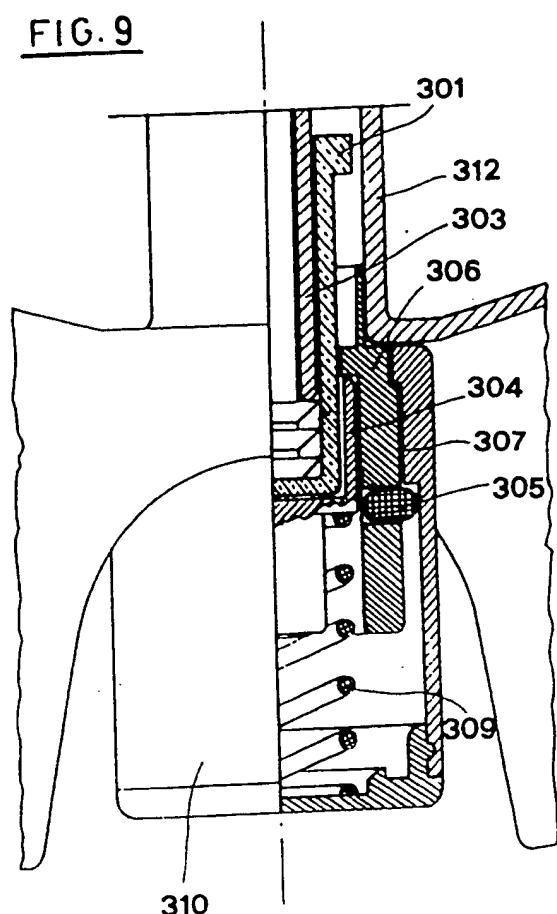
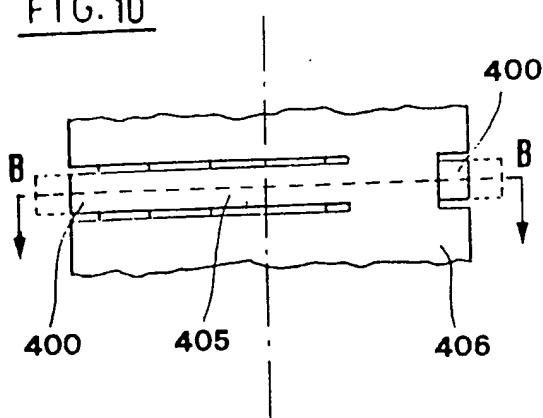
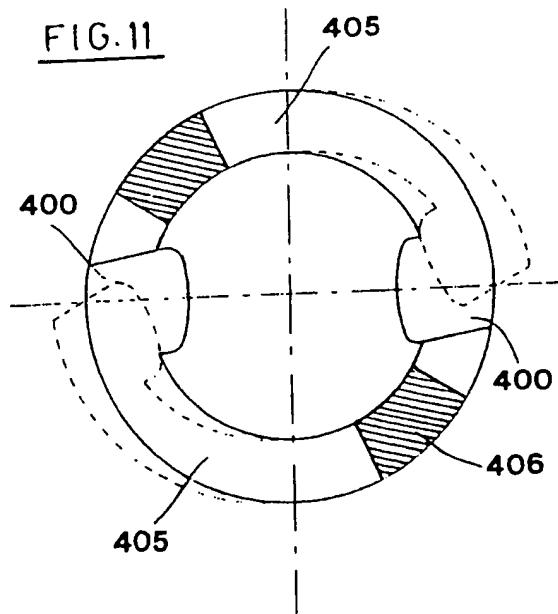
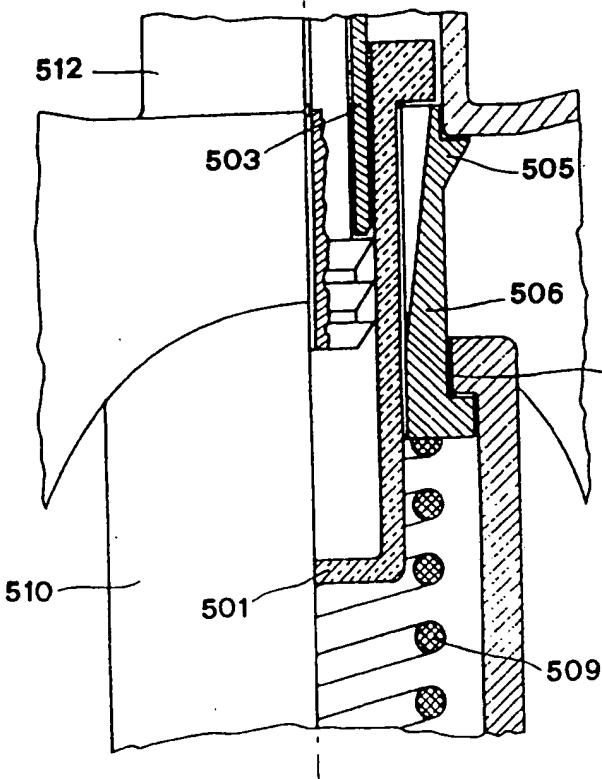
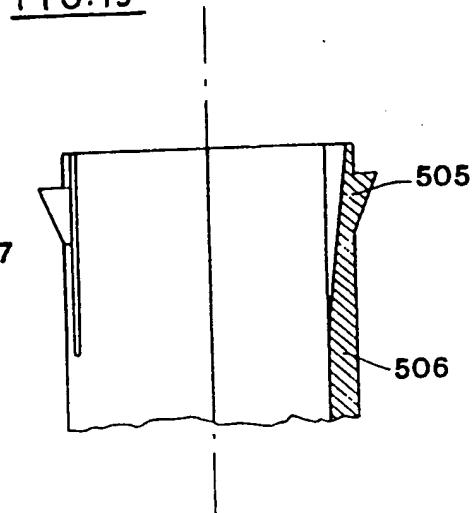
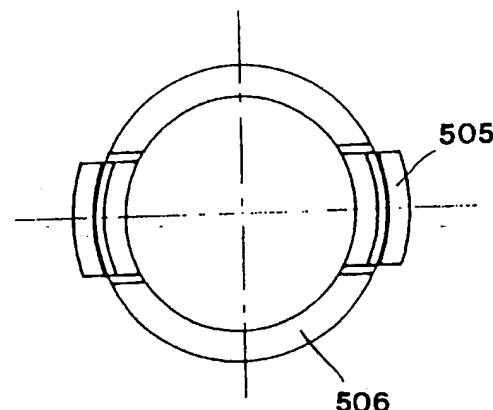
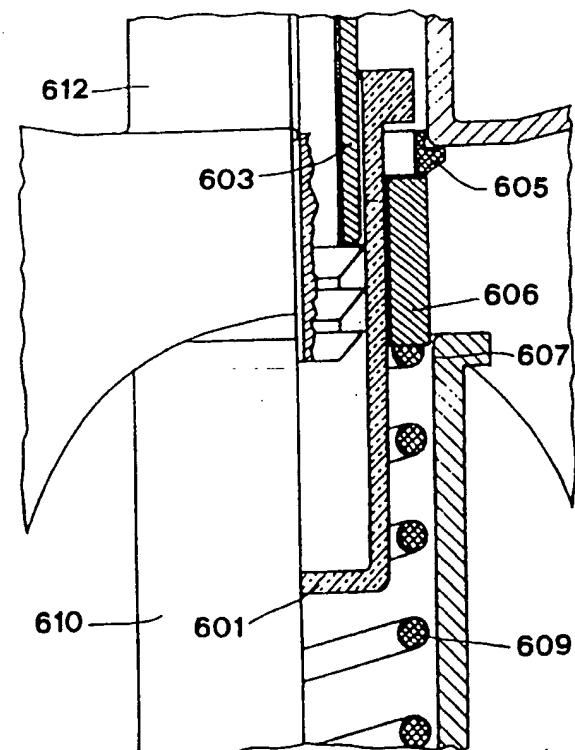
FIG. 8FIG. 9FIG. 10FIG. 11

FIG.12FIG.13FIG.14FIG.15

INTERNATIONAL SEARCH REPORT

PCT/IT 92/00050

International Application No

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all)⁶

According to International Patent Classification (IPC) or to both National Classification and IPC
 Int.Cl. 5 B05B11/00; B05B11/02

II. FIELDS SEARCHED

Minimum Documentation Searched⁷

Classification System	Classification Symbols			
Int.Cl. 5	B05B ;	A61M ;	B65D ;	A61F

Documentation Searched other than Minimum Documentation
 to the Extent that such Documents are Included in the Fields Searched⁸

III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹

Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
A	EP,A,0 127 573 (CWS AG) 5 December 1984 see page 2, line 16 - page 3, line 12 ---	1
A	US,A,4 083 476 (SCHWARTZ ET AL) 11 April 1978 ---	
A	EP,A,0 021 123 (HOECHST AG) 7 January 1981 ---	
A	US,A,3 140 803 (EBERSOLE) 14 July 1964 ---	
A	DE,A,1 804 838 (SCHLOSSAR) 11 June 1970 ---	

¹⁰ Special categories of cited documents :¹⁰

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

¹¹ T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention¹² X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step¹³ Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.¹⁴ & document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search

04 SEPTEMBER 1992

Date of Mailing of this International Search Report

24.09.92

International Searching Authority

EUROPEAN PATENT OFFICE

Signature of Authorized Officer

JUGUET J. M.

ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO. IT 9200050
SA 59318

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information. 04/09/92

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
EP-A-0127573	05-12-84	DE-A-	3413810	18-10-84
		JP-A-	59199071	12-11-84
		US-A-	4579261	01-04-86

US-A-4083476	11-04-78	AT-B-	343788	12-06-78
		AU-A-	7518274	13-05-76
		BE-A-	822806	29-05-75
		CH-A-	582023	30-11-76
		FR-A,B	2252877	27-06-75
		GB-A-	1481199	27-07-77
		JP-A-	50106210	21-08-75
		NL-A-	7415581	03-06-75
		SE-B-	415324	29-09-80
		SE-A-	7415026	02-06-75

EP-A-0021123	07-01-81	AT-T-	4172	15-08-83
		US-A-	4344573	17-08-82

US-A-3140803		None		

DE-A-1804838	11-06-70	None		
